Ultra-Durable Natural Wood Preservation System

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Summary / Use Case

This method provides a renewable, centuries-grade protective shell for dense hardwood using only char, tar, dust, air drying, and simple tools. It is intended for durable, ethical use in legacy-grade homesteads, burial containers, piers, or outdoor infrastructure.

Declaration of Intent

I, Austin Poll, publicly release the following method of ultra-durable wood preservation into the public domain under the terms of CC0 1.0 Universal Dedication. This system is a legacy-oriented, non-toxic, renewable, and field-manageable process for preserving heartwood (especially black locust) in a way that maximizes longevity, environmental harmony, and structural integrity. This method is free for all people to use, study, adapt, or improve. I ask for no credit, control, or compensation. I do this to contribute to long-term sustainable building and ecological legacy work.

System Purpose

This technique preserves solid wood (specifically black locust heartwood) so that it resists:

-Water submersion (floating, submerged, buried)

-UV degradation

-Fire and heat

-Insect infestation

-Mechanical erosion

-Fungal or microbial decay

-Weathering across centuries

It is designed for use in:

• Structural beams and piers

• Legacy caskets or burial vessels

• Water-collecting roof components

• Archive vessels

• Outdoor or subterranean structures intended to last 500–2000+ years with minimal maintenance

Step-by-Step Method

Material Selection

Use 100% solid heartwood black locust, no sapwood. Logs should be well-aged, mature trees.

Air Drying

Air-dry the wood in a covered, shaded, ventilated structure for 1–2 full years. Target moisture content: 8–12%, or as low as 6% for best results. Optional gentle heating may be used near the end to speed drying.

Double Cure (Optional but Recommended)

Soak the fully dried wood in clean water for 2–3 days, then allow it to fully dry again for an additional 2–4 weeks. This “settles” internal fibers and stabilizes the structure for improved long-term performance.

Deep Charring

After all cuts and test-fitting are done, deep-char all outer surfaces using an even flame (torch or fire box).

Char depth: 2–3 mm minimum, uniform, no hotspots

Do not damage joinery

Surface should be matte black, not flaky or powdery

120-Layer Sealing Process

Apply 120 individual coats of natural pine tar, with stone + charcoal dusting and full drying between each layer with a final full cure of all layers.

For Each Layer:

Tar Heating:

Heat to 120–140°F (50–60°C) — hot enough to spread but not bubble

Over 150°F risks chemical breakdown

Early Layers (1–40): 120–130°F for deep penetration into char

Middle Layers (41–80): 125–135°F for balanced viscosity and bond

Final Layers (81–120): 130–140°F for surface hardness and sheen

Layer Thickness:

Early Layers (1–40): thinner layers (~0.1 mm)

Middle Layers (41–80): medium layers (~0.15 mm)

Final Layers (81–120): thicker layers (~0.2 mm)

Total system thickness: 12–24 mm across all layers

Dusting Timing:

Layer Stage	Dust When...	Reason
Early Layers (1–40)	Slightly tacky (2–4 min)	Deep bond to base char; mechanical adhesion
Middle Layers (41–80)	Semi-set (4–8 min)	Prevents dust from sinking too far
Final Layers (81–120)	Near dry (8–12 min)	Encourages mineral finish; highest UV protection

Dust Composition:

50/50 by weight: finely ground stone dust + charcoal dust

Sift gently; tap lightly if needed

Curing Between Layers:

Minimum: 12–24 hours in dry, ventilated environment

In high humidity or low temperatures: up to 36 hours

Do not apply next layer until fully dry

Ideal cure temperature: 65–85°F (18–29°C); do not go below 50°F (10°C)

Environmental Notes:

Cure in shade, protected from rain

Avoid direct sunlight to prevent blistering

Ensure airflow on all sides of the piece

Repeat the process exactly for all 120 layers. Each is an independent, cumulative barrier.

Assembly (If Applicable)

Use hot pine tar at all joints, dowels, or seams

Assemble while tar is warm; allow full curing

If damaged, the outer shell can be patched by re-charring(Only as needed very rare to break all other layers above), reapplying tar/dust, and curing layers locally as needed.

Optional Wax Finish

Apply 1–2 coats of food-safe natural wax mixed with stone + charcoal dust

Use only for UV-exposed or hand-contact surfaces

Buff to finish after curing; not structural but improves feel and water purity

Scientific Strengths

Black Locust Wood:

Compressive strength (parallel to grain): 9,000–15,000 psi

Rated “Highly Durable” for rot and insect resistance

Among the strongest North American hardwoods

Char Layer:

Fire-resistant, fungi-inhibiting, water-shedding surface

Tar & Dust Shell:

UV-resistant, mechanically shielded, layered waterproof membrane

Absorbs and distributes impacts, surface abrasion, and expansion forces

Outlasts untreated oak 10:1 in submerged or contact-soil settings (anecdotal field tests)

Suggested Prototype Test

Build a sealed cube or box (with dowels treated the same) from dried, charred, 120-layered black locust. Include a sheet of paper with ink and a timestamp. Expose to outdoor partial submersion, freeze-thaw, UV, and humidity cycling for 6–12 months. Open and record condition.

Version and Revision Notice

This document represents the initial, fully detailed version of the Ultra-Durable Natural Wood Preservation System, based on extensive research and established scientific principles. While laboratory and field tests are ongoing or forthcoming, the method is released now to establish priority and encourage collaborative refinement. Future updates, improvements, or corrections will be published openly with clear version dates. Users are encouraged to document their own tests and share findings to help evolve the system. This approach balances scientific rigor with practical progress and aims to create a living, community-supported legacy for

ultra-durable wood preservation.

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